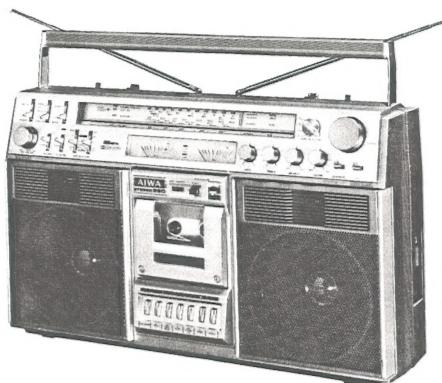


4-BAND RADIO CASSETTE RECORDER

MODEL NO. TPR-990E, K

AIWA®
(SERVICE MANUAL)

Code No. 03-990-000-18



DATE OF ISSUE 3/1980

SPECIFICATIONS

GENERAL

Semiconductors:

7 ICs, 1 FET's, 52 transistors,
21 diodes, 10 LED's

Power source:

Batteries DC 12V (UM-1 x 8)

E model:

AC 110~120V/220~240V
(switchable) 50/60 Hz

K model:

AC 120V/240V

(switchable) 50/60 Hz

Car battery (thru car adaptor)

Power consumption:

E model

35W

K model

40W

Speakers:

160mmφ x 2

50mmφ x 2

Dimension:

514(W) x 383(H) x 139(D)mm

Weight:

7.7 kg

Supplied accessories:

AC power cord x 1

Cassette tape x 1

RADIO SECTION

Circuit:

Superheterodyne

Frequency range:

FM 87.4 ~ 108.3MHz

SW 5.8 ~ 18.5MHz

MW 515 ~ 1,650kHz

LW 145 ~ 320kHz

Intermediate frequency:

FM 10.7MHz

SW, MW, LW 468kHz

Sensitivity:

(IHF, THD 3%)

FM 7 ± 2dB (at 88 MHz)

10 ± 2dB (at 98 MHz)

13 ± 2dB (at 108 MHz)

(S/N 10dB)

SW 33 ± 4dB (at 5.9 MHz)

17 ± 4dB (at 10.0 MHz)

9 ± 4dB (at 18.0 MHz)

(S/N 10dB)

MW 38 ± 4dB (at 600 kHz)

37 ± 4dB (at 1,000 kHz)

36 ± 4dB (at 1,400 kHz)

(S/N 10dB)

LW 47 ± 4dB (at 150 kHz)

44 ± 4dB (at 200 kHz)

42 ± 4dB (at 300 kHz)

Image rejection:

FM 37 ± 4dB (at 108 MHz)

SW 12 ± 3dB (at 18 MHz)

MW 42 ± 4dB (at 1,400 kHz)

LW 49 ± 4dB (at 300 kHz)

IF rejection:

FM 80 ± 6dB (at 108 MHz)

MW 33 ± 3dB (at 600 kHz)

LW 37 ± 3dB (at 300 kHz)

TAPE RECORDER SECTION

Tape speed:

4.76 cm/sec. ± 3%

Recording system:

AC bias

Erasing system:

AC erase

Record bias frequency:

61 ± 0.5 kHz

Distortion:

Less than 1.5% (PB)

Less than 1.5% (REC/PB)

METAL tape 45 ~ 18,000 Hz ± 3dB

CrO₂ tape 45 ~ 17,000 Hz ± 3dB

Fe-Cr tape 45 ~ 17,000 Hz ± 3dB

LH tape 45 ~ 16,000 Hz ± 3dB

Frequency response:

More than 51/48 dB

[DC/AC] (PB)

More than 47/44

[DC/AC] (REC/PB)

Signal to noise ratio:

More than 51dB

(Un-weighted)

[DC/AC] (PB)

More than 47dB

[DC/AC] (REC/PB)

Erasing ratio:

More than 60dB

Separation:

More than 37dB (REC/PB)

Maximum output power:

20W (10W + 10W)

Head:

Sendust guard head (RPH)

Sendust head (EH)

FF & rewind time:

80 ± 5 s. (at C-60)

Automatic stop system:

Mechanical auto stop

Pinch roller pressure:

350 ± 25g (3.43 ± 0.25N)

Wow and flutter:

Less than 0.07% (WRMS)

Take-up torque:

50 ± 10g-cm (0.49 ± 0.098m·N·m)

FF & rewind torque:

100 ± 20 g-cm (0.98 ± 0.196 mN·m)

-10 -10 g-cm (0.98 -0.098 mN·m)

- Specifications and external appearance are subject to change without notice due to product improvement.
- Dolby Noise Reduction System is licensed from Dolby Laboratories.
- The name "Dolby" and the Symbol are trademarks of Dolby Laboratories.

DISASSEMBLY INSTRUCTIONS

1. To Remove Back Cover

- 1) Remove the 7 screws. (See figure 1)

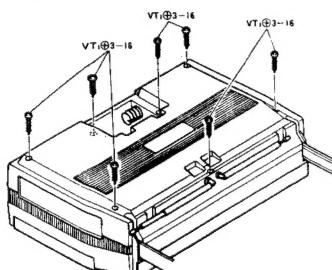


Fig. 1

- 2) Detach 3 connectors.

Caution: Take extra care when disconnecting the antenna terminal. (See figure. 2)

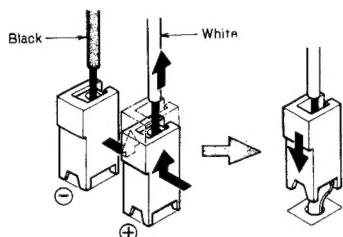


Fig. 2

2. To Remove Tuner Circuit Board

- 1) Remove the 4 screws and use a soldering iron to release the braided Cable. (See figure 3)

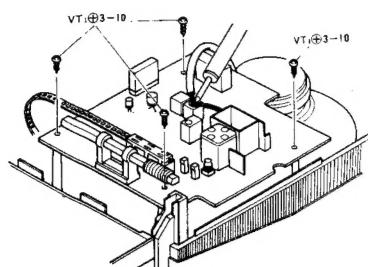


Fig. 3

3. To Remove REC/PB Circuit Board

- 1) Remove the 5 screws. (See figure 4)

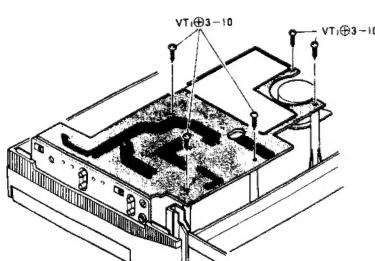


Fig. 4

4. To Remove Radio Chassis

- 1) Remove the two screws and take off the cassette cover.
- 2) Remove all control knobs (total 15 pieces). (See figure 5)

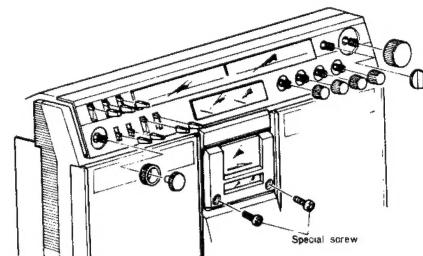


Fig. 5

- 3) Remove the connector.

- 4) Remove the 7 screws. (See figure 6)

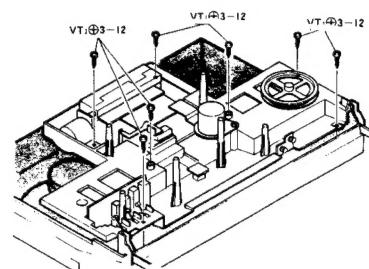


Fig. 6

5. To Remove Mechanism Block

- 1) Slip off the counter belt.
- 2) Remove the reject lever. (See figure 7)
- 3) Remove the E-spring. (See figure 7)

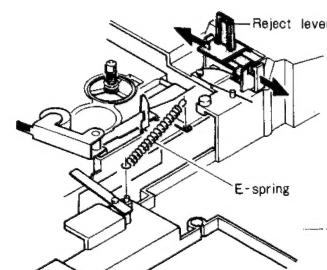


Fig. 7

- 4) Remove the air damp spring. (See figure 8)

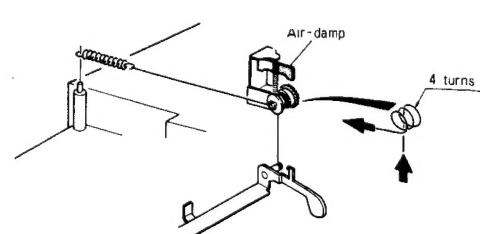


Fig. 8

5) Remove the 7 screws. (See figure 9)

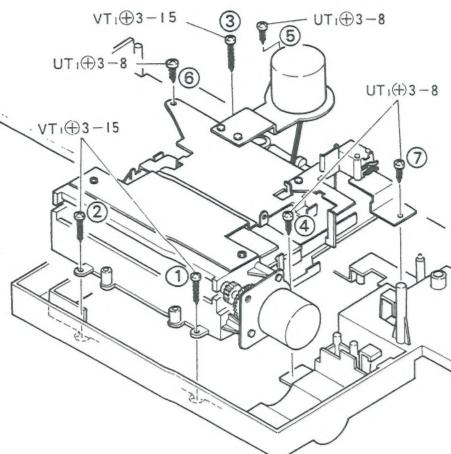


Fig. 9

6) When reinserting the mechanism block, replace the 7 screws in their numerical order as shown in figure 9.

6. To Remove the Motor Drive Mechanism (MD-1)

- 1) Remove the 3 screws from the attaching plate.
- 2) Take out the 2 screws.
- 3) Remove the E-spring (record prevention mechanism). (See figure 10)

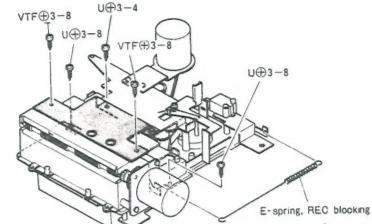


Fig. 10

Adjustment of motor drive mechanism (MD-1), precautions to be taken in parts replacement.

This mechanism has been connected to the PM-1 mechanism, but since it performs complex functions, it is necessary to confirm adjustment procedures. Refer to the information below when making repairs or replacing parts.

1. Motor replacement

- 1) Take out the 2 screws to remove the REC MUTE plate. (See figure 11).

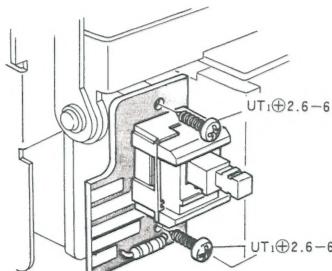


Fig. 11

- 2) Remove the 3 screws. (See figure 12)

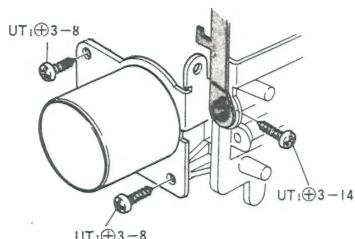


Fig. 12

2. Replacement of lever (gear stopper)

- 1) Stretch out the mechanism frame a to the left and right, remove the axis (gear stopper), and replace it. (See figure 13)

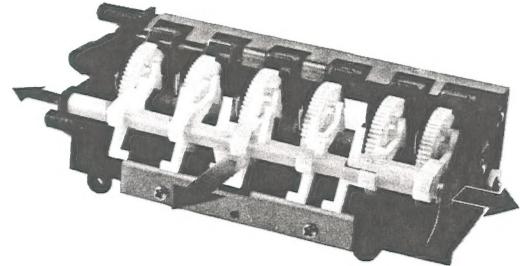


Fig. 13

3. Replacement of gears (REC, FR, PLAY, STOP)

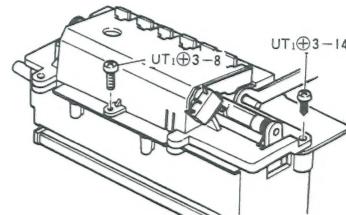


Fig. 14

4) Take off the E-ring, and remove the axis (gear play). At this time be sure to keep the gears in their proper order. (See figure 15)

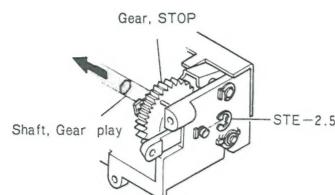


Fig. 15

3) Insert the hub of the lever (gear stopper) into the cam of each gear. (See figure 18)

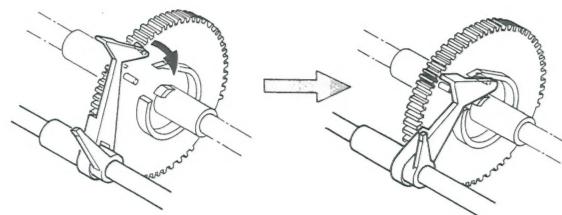


Fig. 18

5) After gear replacement, return each gear to its proper position. (See figure 16)

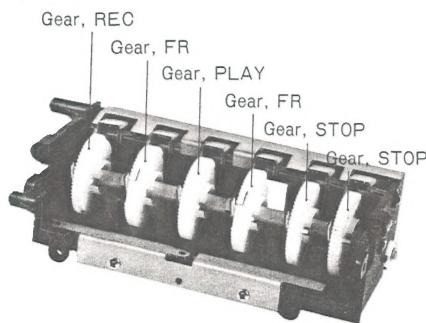


Fig. 16

4. When assembling the MD-1 mechanism

When reinserting the MD-1 mechanism, please give extra attention to the following critical points.

MECHANISM MUST BE INSERTED PROPERLY OR MAL-FUNCTION WILL RESULT.

- 1) After assembling each gear (REC, FR, PLAY, STOP) make sure that the hub of the lever assembly (pushbutton) is inserted into the inside of the cam on each respective gear.
- 2) Rotate each gear to the right and align the levers (pushbutton) to the same position. (See figure 17)

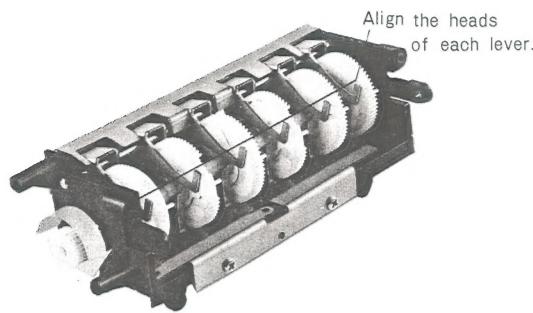


Fig. 17

4) Confirm that the assembly will not move even if the lever (gear stopper) is pressed. (See figure 19)

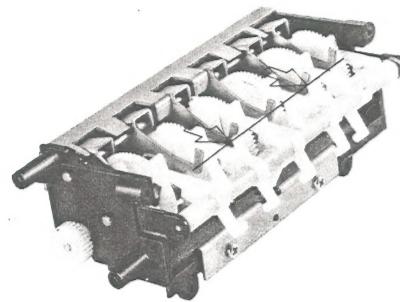


Fig. 19

5) Insert the mechanism frame from above as shown in the illustration, and temporarily secure it. (See figure 20)

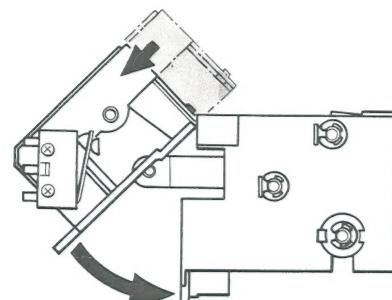


Fig. 20

6) Check to see if the P-spring (lever stopper) is properly set on the lever (gear stopper). (See figure 21)

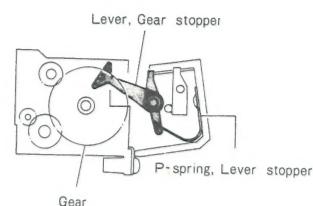


Fig. 21

7) Check to see if the lever (gear stopper) is properly inserted into the plate. (See figure 22)

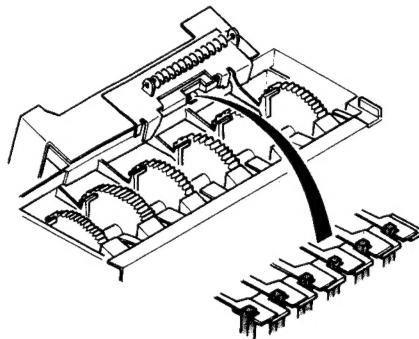


Fig. 22

8) After carrying out steps 1-7 in their proper order, check to see if the MD-1 mechanism will operate normally.
9) Replace the mechanism according to the steps described in the previous part "3".

5. Adjustment of micro switch timing

1) Rotate the micro switch to the right and when the switch is in the ON position, rotate the microswitch back to the left. Temporarily fix it at the position where it goes off. (See figure 23)

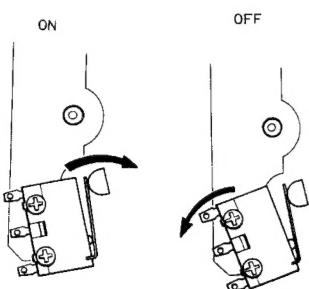


Fig. 23

2) By gently pressing the STOP control the microswitch will come on. Check to see if the motor is rotating at this point. Next, by releasing your finger from the STOP control the button will return, and when the microswitch goes OFF, check to see if there is a gap of approximately 0.3mm between the lever switch and the microswitch. (See figure 24)

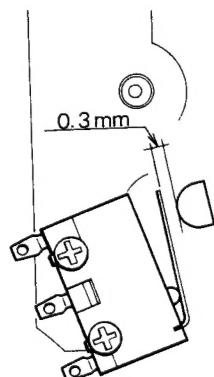


Fig. 24

3) Press the FF control. When the microswitch comes on, the motor will commence rotation. When you remove your finger the button will return to its original position. At this point check to make sure the microswitch is OFF.
4) After checking the above 2) and 3), secure the microswitch in its present position.

NOTE: When checking steps 2) and 3), make sure that the microswitch operation commences BEFORE gear operation. If the following problems occur, adjustment procedure should be repeated.

- 1) Microswitch and gears (FF, STOP) function at the same time.
- 2) Gears (FF, STOP) function before microswitch.

6. Docking of MD-1 and PM-1 mechanisms

1) After docking the above, temporarily fix their positions
2) After pressing the slide plate (FR) in the direction of the arrow, secure the mechanism assembly screws. (See figure 25)

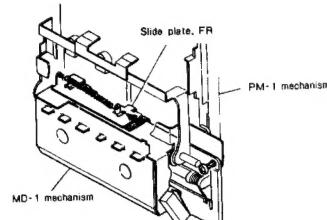


Fig. 25

7. Reattachment of E-spring (record prevention)

1) After docking of MD-1 and PM-1 mechanism is complete, refer to figure 26 to make sure the E-spring (record prevention mechanism) is reattached properly.

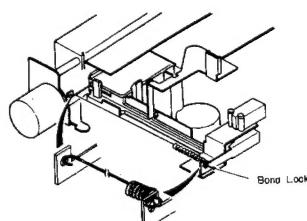
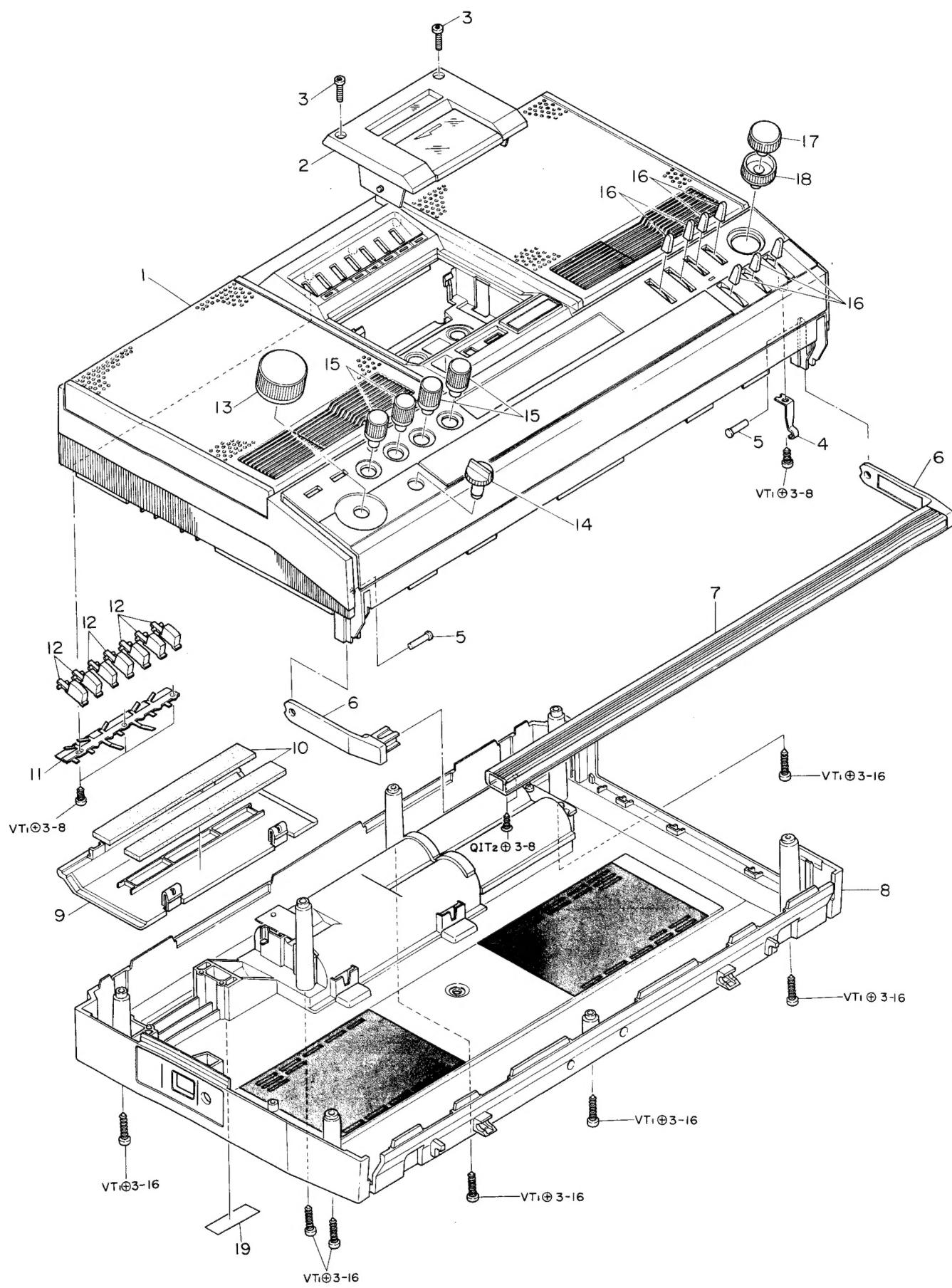


Fig. 26

EXPLODED VIEW-1



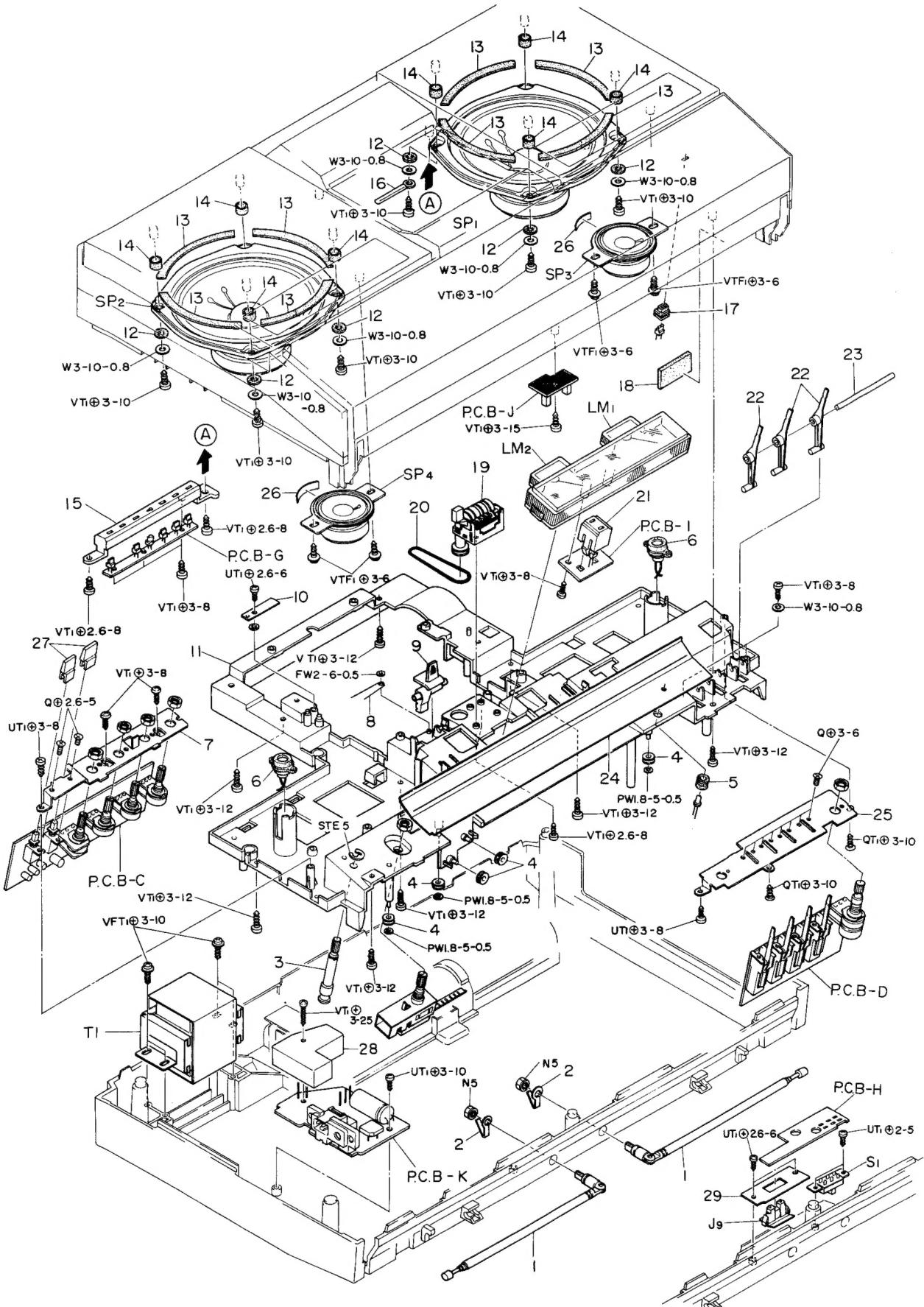
MECHANICAL PARTS

PARTS LIST

■ *mark in this part list shows exclusive part
(which is used) for only Model TPR-990

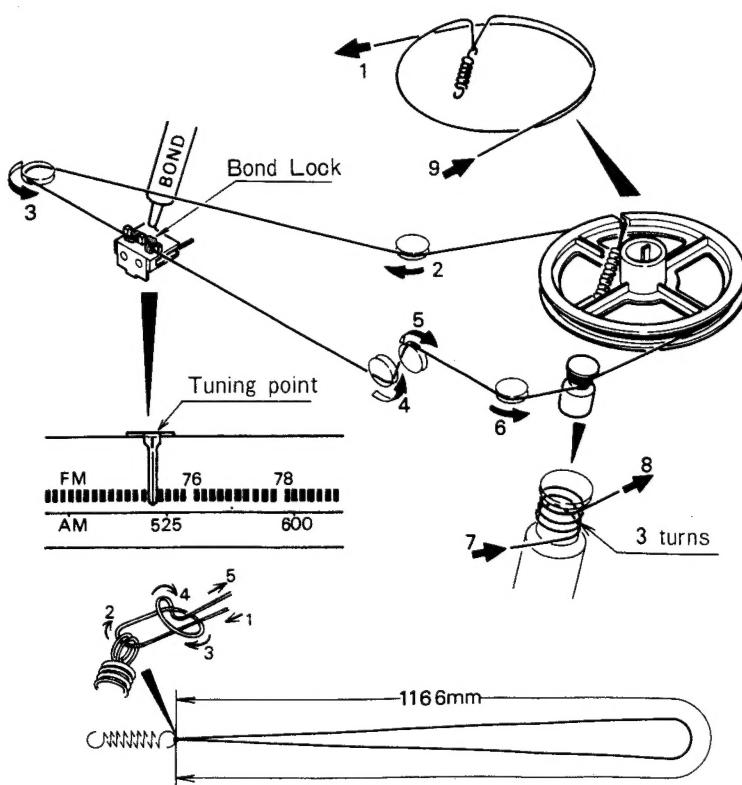
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1-1	09-017-693-01		Main cabinet ass'y (E model only)	*	1
1-1	09-017-700-01		Main cabinet ass'y (K model only)		
	82-563-001-01		Main cabinet	*	1
	82-563-035-01		Panel, Top (E model only)	*	1
	82-563-041-01		Panel, Top (K model only)	*	1
	82-563-004-01		Window, Dial	*	1
	82-563-007-01		Panching speaker	*	2
	82-563-009-01		Name plate A	*	2
	82-563-010-01		Name plate B	*	2
	82-563-049-01		Badge, AIWA	*	1
	82-563-032-01		Cassette plate	*	1
	87-351-098-21		VT ₁ + 3-14		3
1-2	09-017-686-01		Cassette lid ass'y		1
	82-563-011-01		Cassette lid ass'y	*	1
	82-461-319-01		Cushion, Cassette lid	TPR-930	1
	82-541-264-01		P-Spring, Cassette holder R	TPR-950	1
	82-541-265-01		P-Spring, Cassete holder L	TPR-950	1
	82-563-287-01		E-Spring, Cassette lid	*	1
1-3	82-562-047-01		Decorative screw	TPR-926	2
1-4	82-534-204-01		Click plate spring L	TPR-980	1
1-5	82-540-264-11		Shaft, Carrying handle		2
1-6	82-534-013-11		Handle arm R		2
1-7	82-563-026-01		Handle grip	*	1
1-8	09-017-694-01		Back cover ass'y	*	1
	82-563-002-01		Back cover	*	1
	82-551-069-01		Plate, Antenna	TPR-935	1
	82-563-027-01		Dust screen cloth (Back cover)	*	2
	82-563-213-01		Holder, Battery	*	1
	82-222-036-01		Spring, Battery		2
	82-551-213-01		Plate, Battery	TPR-935	1
	82-551-248-01		Faiber, 24-31	TPR-935	1
	87-038-032-01		Terminal plate, Battery		2
	87-351-097-21		VT ₁ + 3-12		2
1-9	82-563-029-01		Battery room lid	*	1
1-10	82-563-280-01		Cushion, Battery room lid	*	2
1-11	82-563-253-01		Plate, Push-key ass'y	*	1
1-12	82-563-020-01		Knob, Push-key A	*	7
1-13	82-563-015-01		Knob, TUNING	*	1
1-14	82-562-051-01		Knob, BAND	TPR-926	1
1-15	82-563-016-01		Knob, VOLUME	*	4
1-16	82-563-014-01		Knob, Lever switch	*	7
1-17	82-563-018-01		Knob, VOLUME B	*	1
1-18	82-563-017-01		Knob, VOLUME A	*	1
1-19	87-056-046-01		Label, Main supply (K model only)		1

EXPLODED VIEW–2

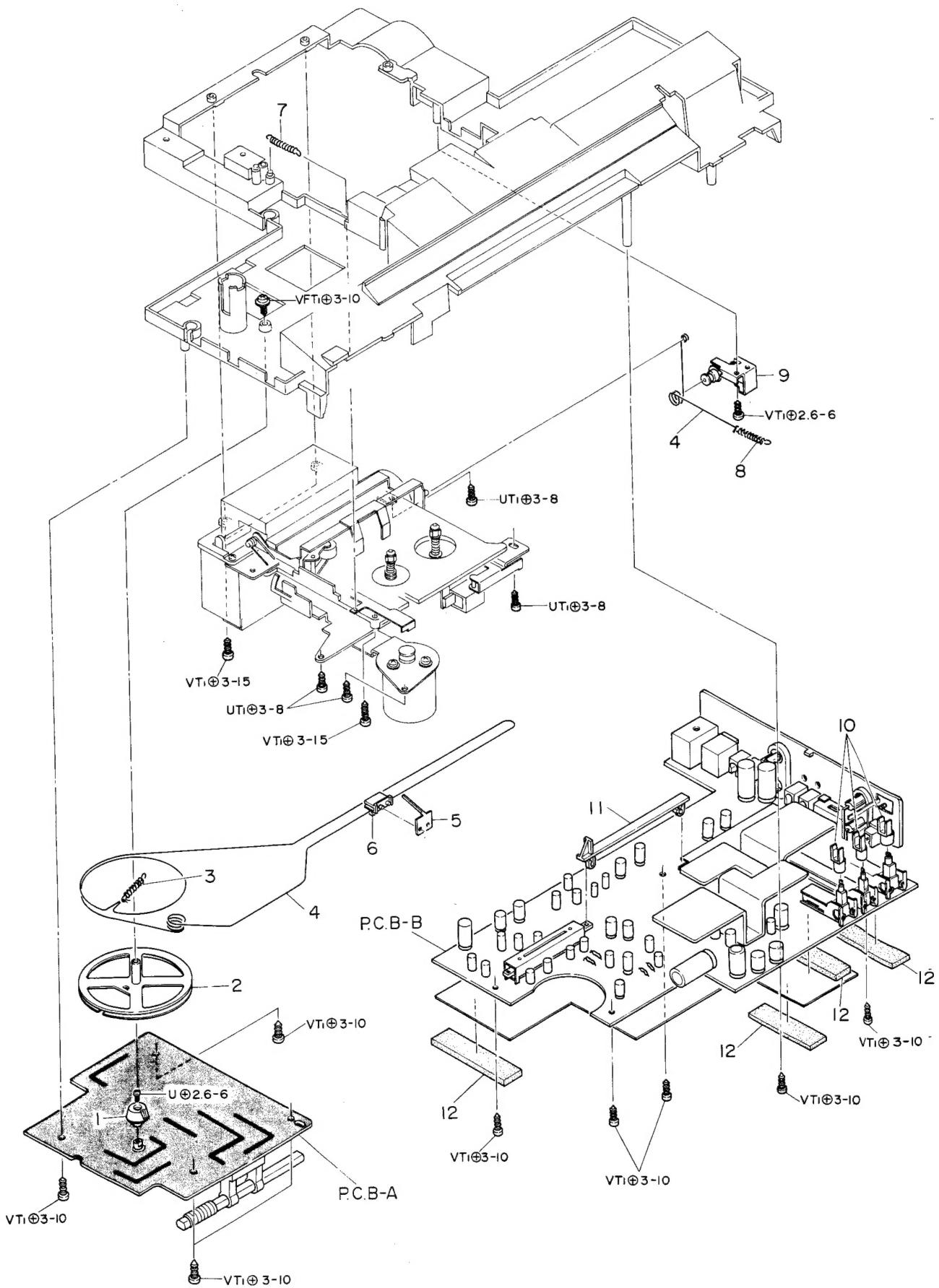


Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
2-1	87-043-039-01		Whip antenna		2
2-2	82-563-240-01		Terminal plate, Antenna	*	2
2-3	82-563-205-01		Shaft, Tuning	*	1
2-4	87-071-013-11		Pulley A		5
2-5	82-463-216-01		Rubber bushing	TPR-900	1
2-6	87-064-084-01		Holder, ECM		2
2-7	82-563-204-01		Metal fitting B	*	1
2-8	82-541-242-01		T-Spring, Stand-by knob	TPR-950	1
2-9	82-563-019-01		Knob, Eject	*	1
2-10	82-551-263-01		P-Spring, Cassette-up	TPR-935	1
2-11	82-563-201-01		Chassis, Main	*	1
2-12	82-563-288-01		Rubber washer 3.3-10-1.5	*	8
2-13	82-563-289-01		Cushion, Speaker	*	8
2-14	82-538-214-01		Cushion		8
2-15	82-563-217-01		Guide, LED	*	1
2-16	87-038-039-01		Wire binder		1
2-17	82-563-242-01		Guide C, LED	*	1
2-18	93-464-154-01		Cushion, Battery		1
2-19	87-040-127-01		Counter		1
2-20	82-530-210-01		Belt, Counter	TPR-216	1
2-21	82-563-239-01		Guide B, LED	*	1
2-22	82-563-203-01		Lever, Switch ass'y	*	3
2-23	82-563-251-01		Shaft, Lever switch	*	1
2-24	82-563-036-01		Dial plate	*	1
2-25	82-563-202-01		Metal fitting A	*	1
2-26	82-563-283-01		Insulation sheet, Speaker	*	2
2-27	82-150-013-01		Push-button		2
2-28	82-551-246-01		Cover, Fuse	TPR-935	1
2-29	82-463-088-11		Terminal plate	TPR-900	1

DIAL CORD STRINGING



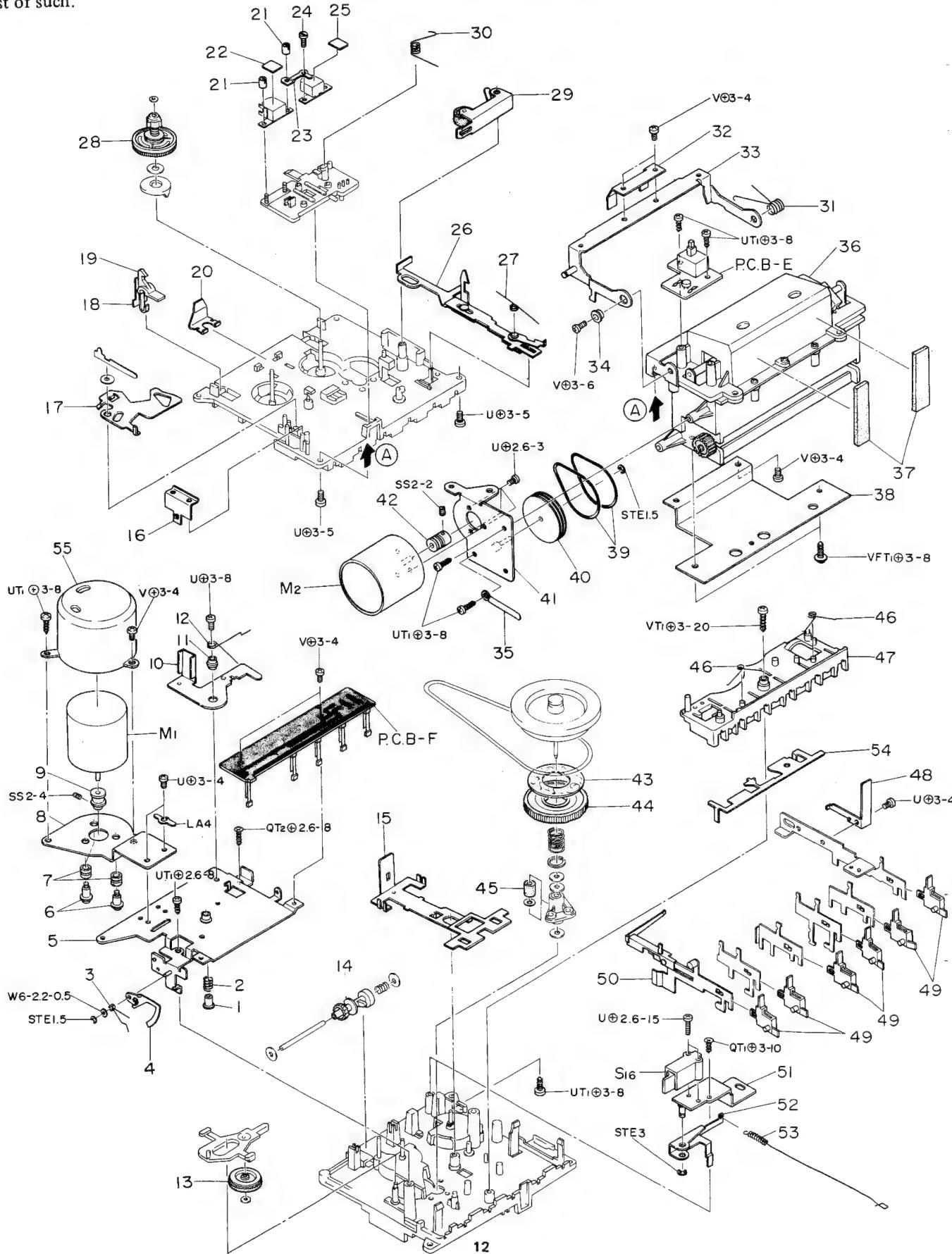
EXPLODED VIEW-3



Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
3-1	82-439-311-01		Drum, Joint	TPR-300	1	
3-2	82-439-310-01		Drum	TPR-300	1	
3-3	82-541-291-01		E-Spring, Dial		1	
3-4	87-096-045-01		String, Dial	*	2	
3-5	82-563-022-01		Pointer, Tuning	*	1	
3-6	82-563-214-01		Holder, Pointer	*	1	
3-7	82-563-248-01		E-Spring, Cassette lock	*	1	
3-8	82-563-247-01		E-Spring, Air damp	*	1	
3-9	87-078-003-01		Air-damp unit ass'y		1	
3-10	82-541-241-01		Joint, Lever switch	TPR-950	3	
3-11	82-563-207-01		Slide lever REC	*	1	
3-12	82-416-260-01		M cushion	TPR-601	4	

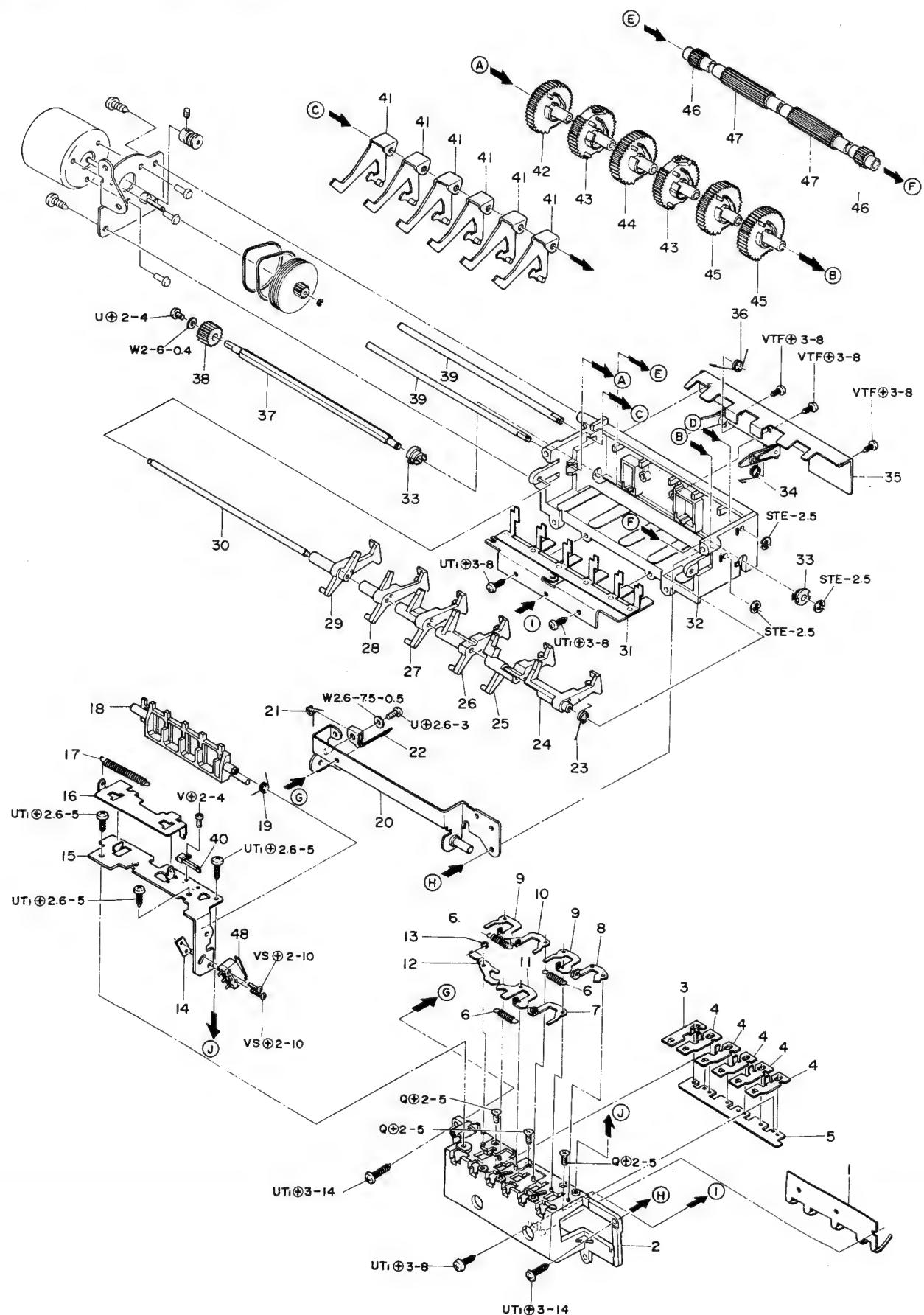
EXPLODED VIEW-4

As this is a PM-1 mechanism, the exploded view is omitted (see the supplement PM-1 mechanism adjustment manual). The exploded view below shows the additional mechanism of the PM-1. Also shown are the attachments of the motor and a list of such.



Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
4-1	82-563-268-01		Shaft, Thrust holder	*	1
4-2	82-563-269-01		E-Spring, Thrust	*	1
4-3	82-534-270-01		T-Spring, PAUSE	TPR-980	1
4-4	82-534-275-01		Lock plate, Stand-by	TPR-980	1
4-5	82-563-265-01		Flywheel bearing plate ass'y	*	1
4-6	87-081-483-01		Motor screw, M2.6		3
4-7	87-087-029-01		Rubber cushion		3
4-8	82-541-230-01		Holder, Motor	TPR-950	1
4-9	87-071-025-01		Pulley-Motor		1
4-10	82-563-206-01		Lever, REC	*	1
4-11	82-534-212-01		Collar, REC lever	TPR-980	1
4-12	82-534-271-01		T-Spring, REC lever	TPR-980	1
4-13	82-439-463-01		Play idler ass'y	TPR-300	1
4-14	82-439-408-01		Worm wheel L ass'y	TPR-300	1
4-15	82-439-269-01		Plate, Brake	TPR-300	1
4-16	82-541-284-01		Plate spring, Wire holder	TPR-950	1
4-17	82-563-228-01		REC lock lever	*	1
4-18	82-563-278-01		P-spring, REC blocking	*	1
4-19	82-439-495-01		REC blocking lever	TPR-300	1
4-20	82-534-297-01		Pressure plate spring, Cassette	TPR-980	1
4-21	82-563-252-01		Nut, 2φ	*	2
4-22	87-057-599-01		Label, SE		1
4-23	82-563-279-01		Earth plate, Head	*	1
4-24	87-081-862-01		REC/PB head adjuster screw		1
4-25	87-057-598-01		Label, SG		1
4-26	82-563-231-01		Lever, Eject ass'y	*	1
4-27	82-563-249-01		T-Spring, Lever cassette-up	*	1
4-28	82-439-576-01		Take-up reel platform ass'y	TPR-300	1
4-29	82-439-422-01		Pinch lever ass'y	TPR-300	1
4-30	82-439-285-01		Spring, Pinch lever	TPR-300	1
4-31	82-541-307-01		T-Spring, Cassette box	TPR-950	1
4-32	82-562-241-01		L metal fitting, Stopper	TPR-926	1
4-33	82-563-244-01		Lever ass'y, Cassette box	*	1
4-34	82-563-238-01		Collar, Cassette box	*	1
4-35	87-038-039-01		Wire binder		1
4-36	09-017-683-01		MD-1 mechanism ass'y		1
4-37	93-464-154-01		Cushion, Battery		2
4-38	82-563-286-01		Plate, Bearing plate	*	1
4-39	82-564-244-01		Rubber belt	MD-1	2
4-40	82-564-222-01		Gear A	MD-1	1
4-41	82-564-203-01		Motor holder ass'y	MD-1	1
4-42	82-564-227-01		Gear, Motor	MD-1	1
4-43	82-439-389-01		Felt 24-30	TPR-300	1
4-44	82-439-355-01		Slip gear	TPR-300	1
4-45	82-439-462-01		Drive rubber	TPR-300	1
4-46	82-439-469-01		Spring A, Push-button	TPR-300	2
4-47	82-439-466-01		Back plate	TPR-300	1
4-48	82-534-298-01		Spring A, REC plate	TPR-980	1
4-49	82-564-234-01		Cover, Push-button	MD-1	6
4-50	82-551-244-01		Pause lever ass'y	TPR-935	1
4-51	82-563-261-01		Holder, Power switch ass'y	*	1
4-52	82-563-258-01		Lever, REC blocking A	*	1
4-53	82-563-212-01		E-Spring, REC blocking	*	1
4-54	82-563-229-01		Slide plate B	*	1
4-55	82-551-629-01		Motor shield cap B	TPR-935	1

EXPLODED VIEW (MD-1 mechanism)



ELECTRICAL MAIN PARTS LIST

Symbol No.	Part No.	Description
< TUNER CIRCUIT BOARD SECTION >		
PCB-A	82-563-659-01	Tuner circuit board
IC1	87-027-285-01	IC, HA-11251
IC2	87-027-430-11	IC, LA-3361
Q1	87-026-107-01	FET, 2SK49F1
Q2,3,4,6	89-319-233-01	Transistor, 2SC1923(O)
Q5	89-319-232-01	Transistor, 2SC1923(R)
Q7,8	89-318-155-01	Transistor, 2SC1815(GR)
Q9,13	89-309-455-01	Transistor, 2SC945L(Q)
Q10	89-404-673-01	Transistor, 2SD467(C)
Q11,12	89-318-154-01	Transistor, 2SC1815(Y)
D1	87-017-004-01	Diode, SD117
D2	88-052-188-11	Diode, 1S188(FM)
D3	87-027-431-01	Zener diode, RD6.2EB2
L1	82-551-675-01	FM antenna coil
L2	87-006-017-01	FM coil, 2½t
L3	87-007-088-01	FM OSC coil, 2-1/4t
L4	82-551-679-01	SW antenna coil
L5,6	82-563-669-01	MW/LW bar antenna coil
L7	82-563-665-01	SW OSC coil
L8	82-563-663-01	MW OSC coil
L9	82-563-664-01	LW OSC coil
L10	87-005-134-01	Coil
L11	87-008-209-01	Quad coil
L12	87-005-101-01	FM choke coil, 2.2μH
VC1~5	82-546-607-21	PVC
TC1~4		
TC5,7,8	87-011-099-01	Trimmer
TC6,9	87-011-021-01	Trimmer
CF1,2	87-008-169-01	Ceramic filter
CFT1	82-494-786-01	Ceramic filter transformer
IFT1	87-008-187-01	AM IFT
LPF1	87-030-070-01	Low pass filter
S2	82-563-661-01	Remote switch (BAND SELECTOR)
S25	82-541-644-01	Push switch (AFC)
SFR1	87-021-570-01	Semi-fixed resistor, 100kΩ-B
SFR2	87-021-566-01	Semi-fixed resistor, 5kΩ-B
PIN-1	87-032-907-01	Pin, 7P
< Capacitors >		
C73,76	87-015-321-01	0.47μF 10V Aluminum solid
C75	87-015-316-01	1μF 10V Aluminum solid
C72	87-014-057-01	1000pF PP
< REC/PB CIRCUIT BOARD SECTION >		
PCB-B	82-563-637-01	REC/PB circuit board
IC101	87-027-539-01	IC, LA3161
IC103,104	87-027-460-01	IC, LM1011N
IC105,106	87-027-540-01	IC, AN-7146
Q101,102,107, 108	89-322-406-01	Transistor, 2SC2240(BL)
Q103,104	89-307-325-01	Transistor, 2SC732(G)
Q105,106,109, 110,111,112, 115,116,117, 118,123,124, 125,126,127, 128,129,130, 131,132,133, 134,139,140	89-318-154-01	Transistor, 2SC1815(Y)
Q113,114	89-110-154-01	Transistor, 2SA1015(Y)
Q119,120,121, 122	89-318-155-01	Transistor, 2SC1815(GR)
Q137	89-318-464-01	Transistor, 2SC1846(R)

Symbol No.	Part No.	Description
< SWITCH CIRCUIT BOARD SECTION >		
D101,102,103, 104,107,108, 116,117,118	87-027-097-01	Diode, 1S1555
D105,106,109, 110,111,112, 113,114	88-052-188-11	Diode, 1S188(FM)
D115	87-027-241-01	Zener diode, 05Z9.1L
L101,102,103, 104	87-008-173-01	Bias trap coil
L105,106	87-003-039-01	Choke coil, 36μH
L107	82-401-661-01	Choke coil, 600μH
BIAS OSC UNIT	82-563-618-01	Bias OSC Unit
J1,2	87-032-741-01	DIN socket, 5P w/switch (DIN 1,2)
J3,4	87-032-742-01	DIN socket, 2P w/switch (EXT SP)
J5,6	82-563-630-01	Jack plate ass'y (PLAYER SYNC, PHONES)
S3a	82-563-610-01	Slide switch (REC/PB)
S3b	87-031-529-01	Slide switch (REC/PB)
S4	82-563-611-01	Lever switch (FUNCTION)
S5	87-031-531-01	Lever switch (MODE)
S6	87-031-530-01	Lever switch (SLEEP)
S7	82-431-604-01	Slide switch (OSC)
S11	82-563-609-01	Slide switch (PHONO/AUX)
SFR101,102, 103,104,111	87-021-569-01	Semi-fixed resistor, 50kΩ-B
SFR105,106	87-021-573-01	Semi-fixed resistor, 3kΩ-B
SFR107	87-021-571-01	Semi-fixed resistor, 200kΩ-B
SFR108	87-021-566-01	Semi-fixed resistor, 5kΩ-B
SFR109,110	87-021-307-01	Semi-fixed resistor, 50kΩ-B
PIN-3	87-032-991-01	Pin, 3P
PIN-2	87-032-992-01	Pin, 4P
< Resistors >		
R301,302	87-029-108-01	1Ω ½w Fuse resistor
R298	87-029-060-01	33Ω ½w Fuse resistor
R225,226	87-025-209-01	3.3kΩ Metal film
< Capacitors >		
C101,102	87-015-311-01	0.1μF 10V Aluminum solid
C191,192	87-015-319-01	0.22μF 10V Aluminum solid
C209,210,241, 242	87-015-316-01	1μF 10V Aluminum solid
C119,120,159, 160,181,182	87-014-051-01	560pF PP
C167,168	87-014-114-01	0.0047μF PP
C175,176	87-014-115-01	0.0056μF PP
C165,166	87-014-119-01	0.027μF PP
< VOLUME CIRCUIT BOARD SECTION >		
PCB-C	82-563-638-01	Volume circuit board
Q135,136	89-318-154-01	Transistor, 2SC1815(Y)
VR301,302, 303,304	82-563-606-01	Volume, 50kΩ-A (TREBLE BASS)
VR305,306	82-563-607-01	Volume, 20kΩ-A (VOLUME)
VR307	82-563-608-01	Volume, 100kΩ-W (BALANCE)
S9	82-541-644-01	Push-switch (LOUDNESS)
< Capacitors >		
C301,302,307, 308	87-015-319-01	0.22μF 10V Aluminum solid
C311,312,323, 324	87-015-321-01	0.47μF 10V Aluminum solid

Symbol No.	Part No.	Description
< REC MUTE CIRCUIT BOARD SECTION >		
PCB-E	82-563-640-01	REC MUTE circuit board
Q501	89-318-154-01	Transistor, 2SC1815(Y)
S14	87-031-532-01	Push switch (REC MUTE)
< KEY BOARD SWITCH CIRCUIT BOARD SECTION >		
PCB-F	82-563-643-01	Key board switch circuit board
S20,21,22,23, 24	87-031-538-01	Leaf switch (PAUSE, FF/CUE, PLAY, REW/REVIEW, REC)
PIN-4	87-032-917-01	Pin, 7P
< LED-1 CIRCUIT BOARD SECTION >		
PCB-G	82-563-642-01	LED-1 circuit board
D1,2	87-027-585-01	Light emitting diode, GL-9PR-9
D3,5,6	82-563-635-01	Light emitting diode, GL-9PG-59
D4	87-027-587-01	Light emitting diode, GL-9PG-6
CON-4	82-563-614-01	Connector ass'y, 7P
< ANTENNA CIRCUIT BOARD SECTION >		
PCB-H	82-563-658-01	Antenna circuit board
J9	82-488-656-01	Jack (EXT ANT)
S1	82-533-628-01	Slide switch (ANT SELECTOR)
< LED-2 CIRCUIT BOARD SECTION >		
PCB-I	82-563-641-01	LED-2 circuit board
D1,2	87-027-585-01	Light emitting diode, GL-9PR-9
< RELAY CIRCUIT BOARD SECTION >		
PCB-J	82-563-649-01	Relay circuit board
	87-032-981-01	Wire post
< POWER CIRCUIT BOARD SECTION >		
PCB-K	82-551-672-21	Power circuit board
D451	87-027-609-01	Encapsulated diode
J7,8	87-032-958-01	Jack (AC, DC)
S27	87-031-466-01	Slide switch (VOLTAGE SELECTOR)
F1	87-035-145-01	Fuse, "T" 250mA
	87-098-010-01	Fuse label, "T" 250mA
F2	87-035-191-01	Fuse, "T" 3.15A
	87-098-021-01	Fuse label, "T" 3.15A
	87-033-147-01	Fuse clamp
R450	87-025-194-01	< Resistor > 220Ω 2w Metal film
< MISCELLANEOUS >		
T1	82-563-631-01	Power transformer
RPH	87-046-178-01	REC/PB head
EH	87-046-179-01	Erase head
D1	82-563-635-01	Light emitting diode, GL-9PG-59 (DOLBY NR)

 Safety component symbol
This symbol is given to important components to maintain the safety of the product. Therefore, when replacing a component, make absolutely sure to conform to special regulations. When replacing a component with a new one, make absolutely sure to maintain the safety of the product.

Symbol No.	Part No.	Description
D101,102,103, 104,107,108, 116,117,118	87-027-097-01	Diode, 1S1555
D105,106,109, 110,111,112, 113,114	88-052-188-11	Diode, 1S188(FM)
D115 L101,102,103, 104	87-027-241-01 87-008-173-01	Zener diode, 05Z9.1L Bias trap coil
L105,106	87-003-039-01	Choke coil, 36μH
L107	82-401-661-01	Choke coil, 600μH
BIAS OSC UNIT	82-563-618-01	Bias OSC Unit
J1,2	87-032-741-01	DIN socket, 5P w/switch (DIN 1,2)
J3,4	87-032-742-01	DIN socket, 2P w/switch (EXT SP)
J5,6	82-563-630-01	Jack plate ass'y (PLAYER SYNC, PHONES)
S3a	82-563-610-01	Slide switch (REC/PB)
S3b	87-031-529-01	Slide switch (REC/PB)
S4	82-563-611-01	Lever switch (FUNCTION)
S5	87-031-531-01	Lever switch (MODE)
S6	87-031-530-01	Lever switch (SLEEP)
S7	82-431-604-01	Slide switch (OSC)
S11	82-563-609-01	Slide switch (PHONO/AUX)
SFR101,102, 103,104,111	87-021-569-01	Semi-fixed resistor, 50kΩ-B
SFR105,106	87-021-573-01	Semi-fixed resistor, 3kΩ-B
SFR107	87-021-571-01	Semi-fixed resistor, 200kΩ-B
SFR108	87-021-566-01	Semi-fixed resistor, 5kΩ-B
SFR109,110	87-021-307-01	Semi-fixed resistor, 50kΩ-B
PIN-3	87-032-991-01	Pin, 3P
PIN-2	87-032-992-01	Pin, 4P
R301,302	87-029-108-01	< Resistors > 1Ω ½w Fuse resistor
R298	87-029-060-01	33Ω ½w Fuse resistor
R225,226	87-025-209-01	3.3kΩ Metal film
C101,102	87-015-311-01	< Capacitors > 0.1μF 10V Aluminum solid
C191,192	87-015-319-01	0.22μF 10V Aluminum solid
C209,210,241, 242	87-015-316-01	1μF 10V Aluminum solid
C119,120,159 160,181,182	87-014-051-01	560pF PP
C167,168	87-014-114-01	0.0047μF PP
C175,176	87-014-115-01	0.0056μF PP
C165,166	87-014-119-01	0.027μF PP
Q135,136	82-563-638-01	< VOLUME CIRCUIT BOARD SECTION >
VR301,302, 303,304	89-318-154-01 82-563-606-01	Volume circuit board Transistor, 2SC1815(Y) Volume, 50kΩ-A (TREBLE BASS)
VR305,306	82-563-607-01	Volume, 20kΩ-A (VOLUME)
VR307	82-563-608-01	Volume, 100kΩ-W (BALANCE)
S9	82-541-644-01	Push-switch (LOUDNESS)
C301,302,307, 308	87-015-319-01	< Capacitors > 0.22μF 10V Aluminum solid
C311,312,323, 324	87-015-321-01	0.47μF 10V Aluminum solid

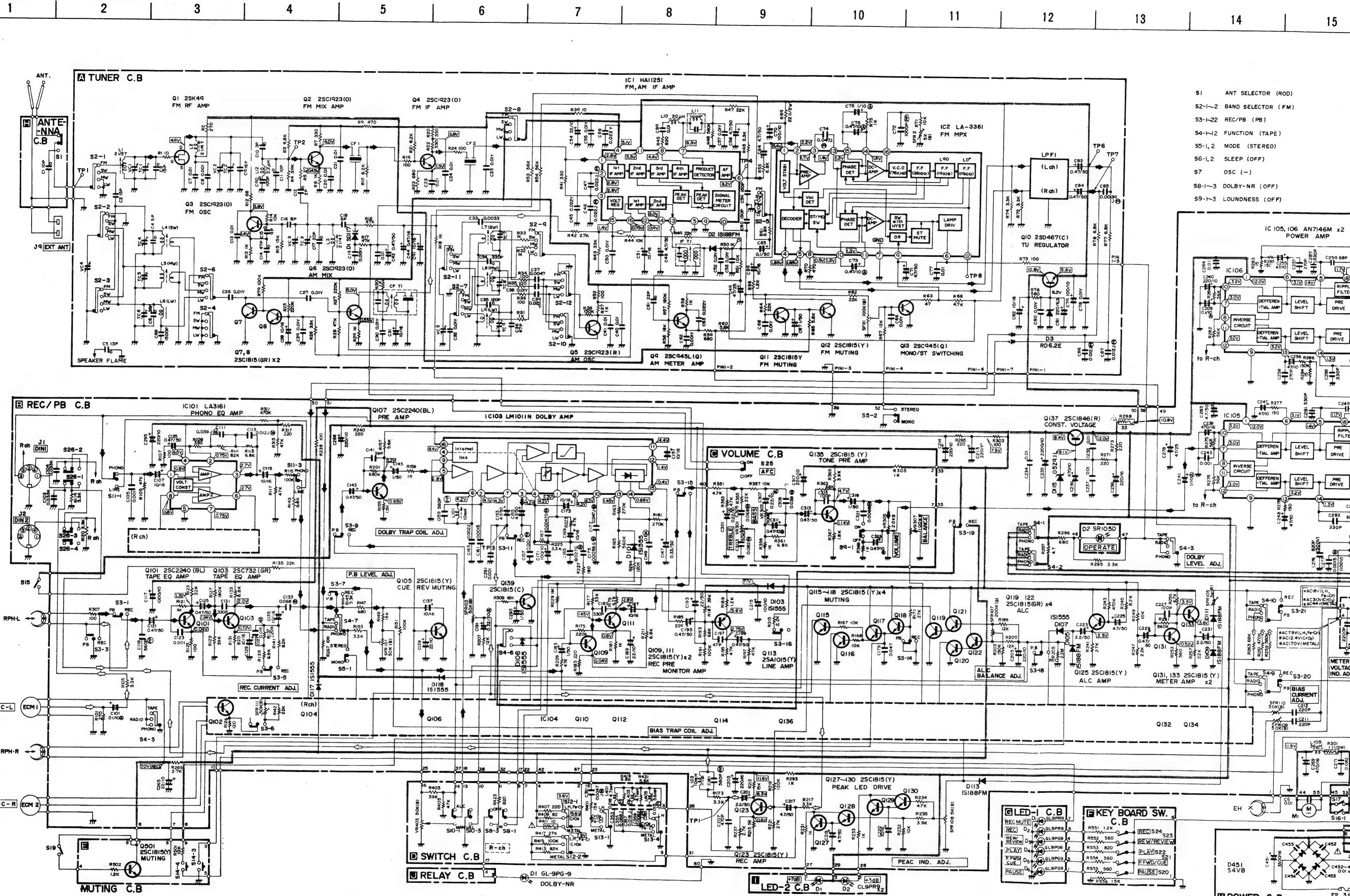
Symbol No.	Part No.	Description
< SWITCH CIRCUIT BOARD SECTION >		
PCB-D	82-563-639-01	Switch circuit board
VR403,404	82-563-605-01	Volume, 50kΩ-A (REC VOLUME)
L401,402,403, 404	87-005-093-01	Micro inductor coil, 4.7mH
L405,406	87-005-088-01	Micro inductor coil, 5.6mH
S8,10	87-031-533-01	Lever switch (DOLBY NR, RECORD)
S12,13	87-031-535-01	Lever switch (BIAS, EQ)
R411	87-029-015-01	< Resistor > 10Ω ¼w Fuse resistor
< REC MUTE CIRCUIT BOARD SECTION >		
PCB-E	82-563-640-01	REC MUTE circuit board
Q501	89-318-154-01	Transistor, 2SC1815(Y)
S14	87-031-532-01	Push switch (REC MUTE)
< KEY BOARD SWITCH CIRCUIT BOARD SECTION >		
PCB-F	82-563-643-01	Key board switch circuit board
S20,21,22,23, 24	87-031-538-01	Leaf switch (PAUSE, FF/CUE, PLAY, REW/REVIEW, REC)
PIN-4	87-032-917-01	Pin, 7P
< LED-1 CIRCUIT BOARD SECTION >		
PCB-G	82-563-642-01	LED-1 circuit board
D1,2	87-027-585-01	Light emitting diode, GL-9PR-9
D3,5,6	82-563-635-01	Light emitting diode, GL-9PG-59
D4	87-027-587-01	Light emitting diode, GL-9PG-6
CON-4	82-563-614-01	Connector ass'y, 7P
< ANTENNA CIRCUIT BOARD SECTION >		
PCB-H	82-563-658-01	Antenna circuit board
J9	82-488-656-01	Jack (EXT ANT)
S1	82-533-628-01	Slide switch (ANT SELECTOR)
< LED-2 CIRCUIT BOARD SECTION >		
PCB-I	82-563-641-01	LED-2 circuit board
D1,2	87-027-585-01	Light emitting diode, GL-9PR-9
< RELAY CIRCUIT BOARD SECTION >		
PCB-J	82-563-649-01	Relay circuit board
	87-032-981-01	Wire post
< POWER CIRCUIT BOARD SECTION >		
PCB-K	82-551-672-21	Power circuit board
D451	87-027-609-01	Encapsulated diode
J7,8	87-032-958-01	Jack (AC, DC)
S27	87-031-466-01	Slide switch (VOLTAGE SELECTOR)
F1	87-035-145-01	Fuse, "T" 250mA
F2	87-098-010-01 87-035-191-01 87-098-021-01 87-033-147-01	Fuse label, "T" 250mA Fuse, "T" 3.15A Fuse label, "T" 3.15A Fuse clamp
R450	87-025-194-01	< Resistor > 220Ω 2w Metal film
< MISCELLANEOUS >		
T1	82-563-631-01	Power transformer
RPH	87-046-178-01	REC/PB head
EH	87-046-179-01	Erase head
D1	82-563-635-01	Light emitting diode, GL-9PG-59 (DOLBY NR)

Symbol No.	Part No.	Description
D2	87-027-218-01	Light emitting diode, SR-105D (OPERATE/FM STEREO)
ECM1,2	85-868-025-01	ECM, CMU-9-R1
M1	87-045-135-01	Motor, DC-EG
M2	87-045-138-01	Motor, MD
SP1,2	82-563-601-01	Speaker (Woofers)
SP3,4	82-563-602-01	Speaker (Tweeter)
S15	82-439-604-21	Leaf switch (TP MUTING)
S16	87-031-493-01	Micro switch (MOTOR POWER)
S17	87-031-393-01	Leaf switch (AUTO STOP)
S18	87-031-537-01	Micro switch (MOTOR SHIFT)
S19	87-031-548-01	Leaf switch (MUTING)
LM1,2	82-563-629-01	Level meter
CON-3	82-563-612-01	Connector ass'y, 3P
CON-2	82-563-613-01	Connector ass'y, 4P
CON-1	82-563-616-01	Connector ass'y, 7P
C3,4	82-891-610-01	< Capacitor > 3.3μF 50V Electrolytic BP

▲ Safety component symbol

This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

SCHEMATIC DIAGRAM



NOTES:

- B (+) power supply
- Signal path
- ⇒ Rec path, AM signal path.
- The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals. But () is with AM reception or recording.
- An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

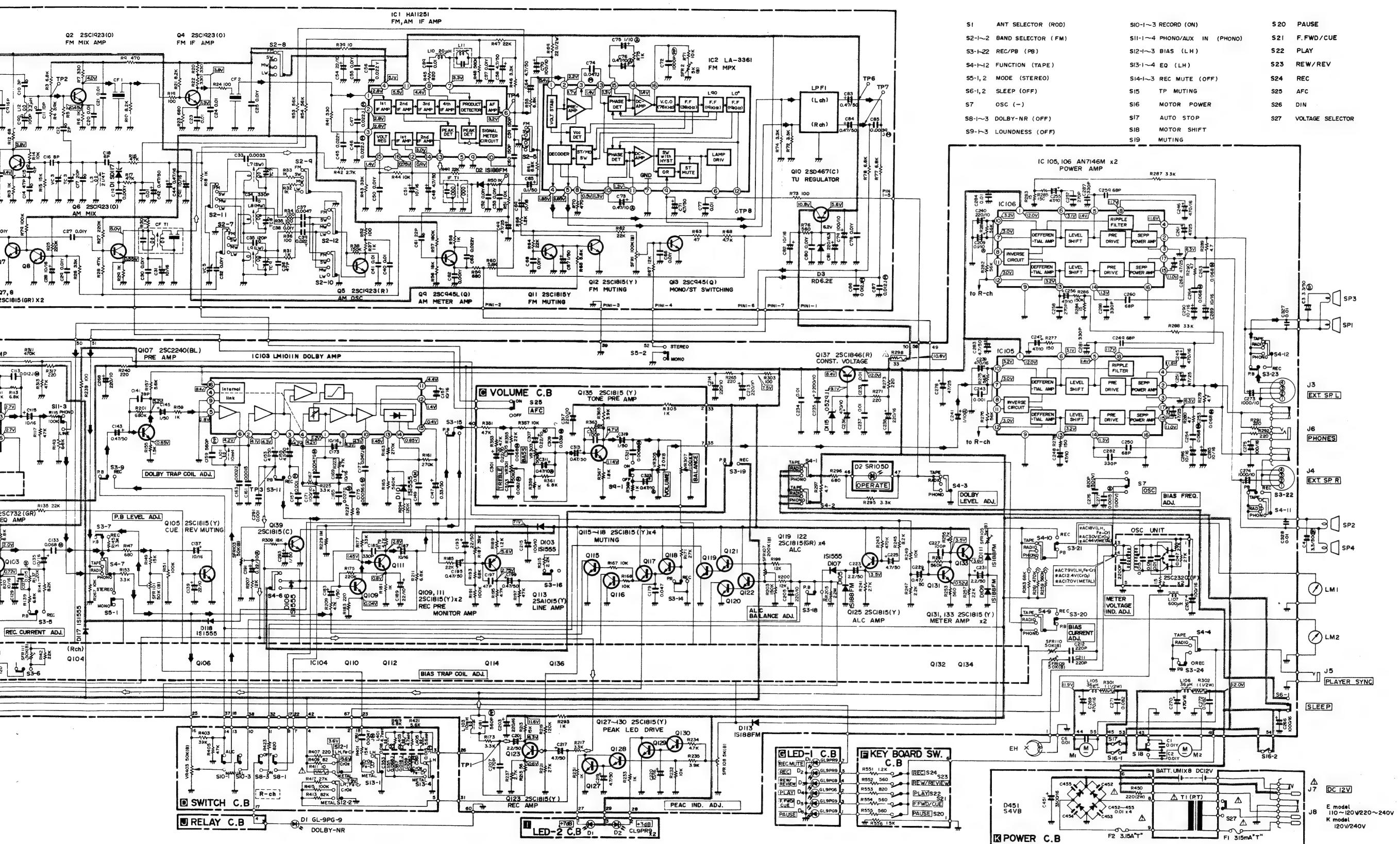
- Resistors with no designation have a rated power of 1/4W and a tolerance of ±5%.
- Capacitors with no designation have a dielectric strength of less than 50VW.
- The only capacitor tolerances indicated are ±5% (J) and ±10% (K).
- Ceramic capacitor symbols:
 - For temperature compensation (SL)
 - YY High dielectric constant system (YY)

- High dielectric constant system (YW, YP, YZ)
- Semiconductor ceramic
- For temperature compensation (SH)
- Explanation of symbols:
 - (M) Mylar capacitor
 - (A) Aluminum solid capacitor
 - (PP) Polypropylene film capacitor
 - (BP) Bi-polarized capacitor
 - WW Fuse resistor

△ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

- This schematic diagram is subject to change without notice in the interests of improved performance.

4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18



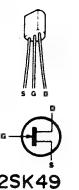
- 4) Resistors with no designation have a rated power of $\frac{1}{4}W$ and a tolerance of $\pm 5\%$.
- 5) Capacitors with no designation have a dielectric strength of less than $50WV$.
- 6) The only capacitor tolerances indicated are $\pm 5\%$ (J) and $\pm 10\%$ (K).
- 7) Ceramic capacitor symbols:
 - \square For temperature compensation (SL)
 - \square High dielectric constant system (YY)

- \square High dielectric constant system (YW, YP, YZ)
- \bullet Semiconductor ceramic
- \diamond For temperature compensation (SH)
- 8) Explanation of symbols
 - (M) Mylar capacitor
 - (A) Aluminum solid capacitor
 - (PP) Polypropylene film capacitor
 - (BP) Bi-polarized capacitor
 - \square Fuse resistor

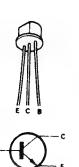
Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

- This schematic diagram is subject to change without notice in the interests of improved performance.

S1	ANT SELECTOR (ROD)	S10-1~3 RECORD (ON)	S20 PAUSE
S2-1~2	BAND SELECTOR (FM)	S11-1~4 PHONO/AUX IN (PHONO)	S21 F. FW/CUE
S3-1~2	REC/PB (PB)	S12-1 BIAS (LH)	S22 PLAY
S4-1~2	FUNCTION (TAPE)	S13-1~4 EQ (LH)	S23 REW/REV
S5-1,2	MODE (STEREO)	S14-1~3 REC MUTE (OFF)	S24 REC
S6-1,2	SLEEP (OFF)	S15 TP MUTING	S25 AFC
S7	OSC (-)	S16 MOTOR POWER	S26 DIN
S8-1~3	DOLBY-NR (OFF)	S17 AUTO STOP	S27 VOLTAGE SELECTOR
S9-1~3	LOUDNESS (OFF)	S18 MOTOR SHIFT	
S19	MUTING		



2SK49

2SC380
2SC732

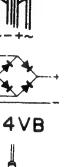
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2SC2240
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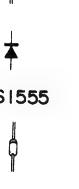
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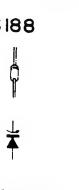
S4VB



IS1555

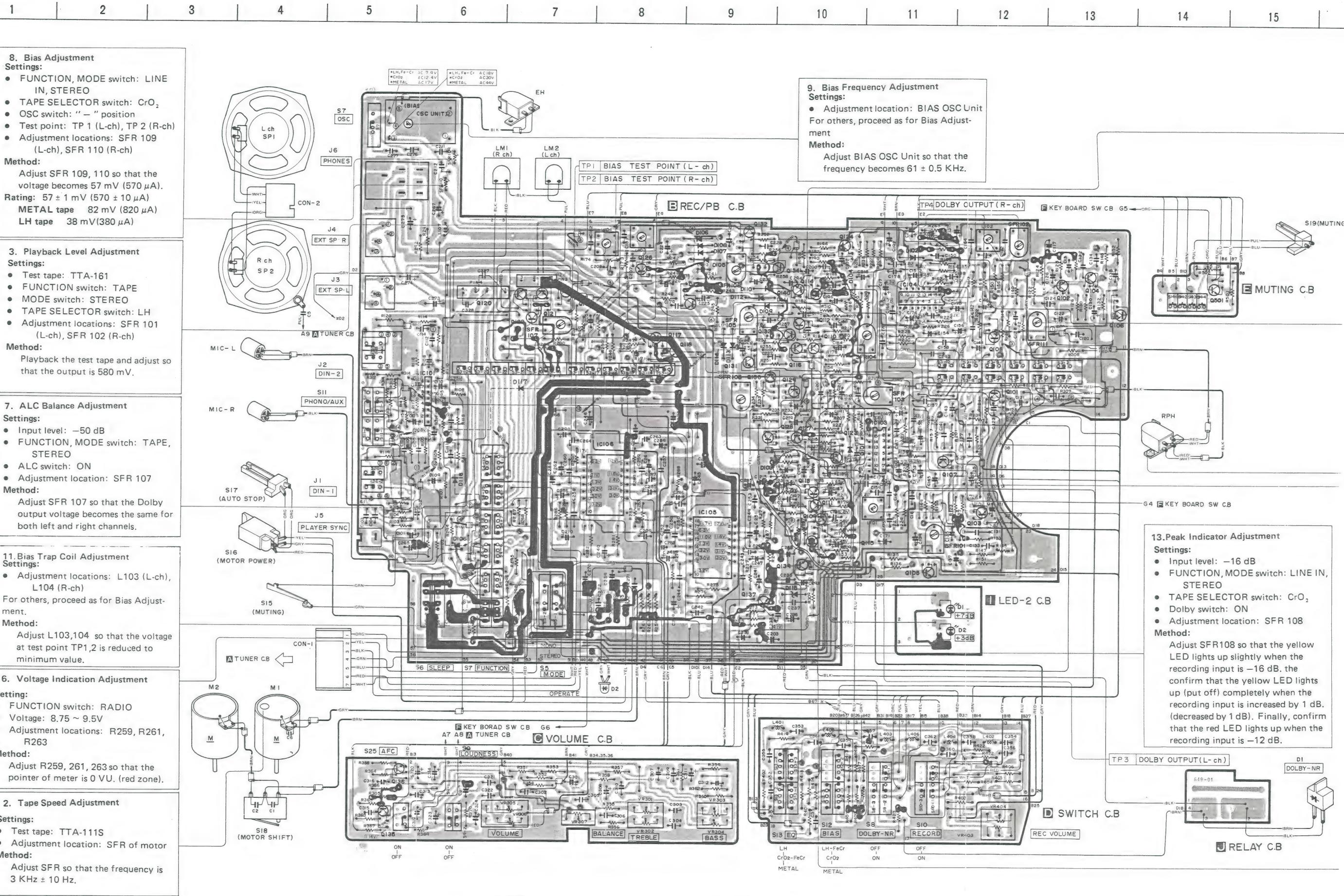
RD6.2
0.5291

IS188



SD-117

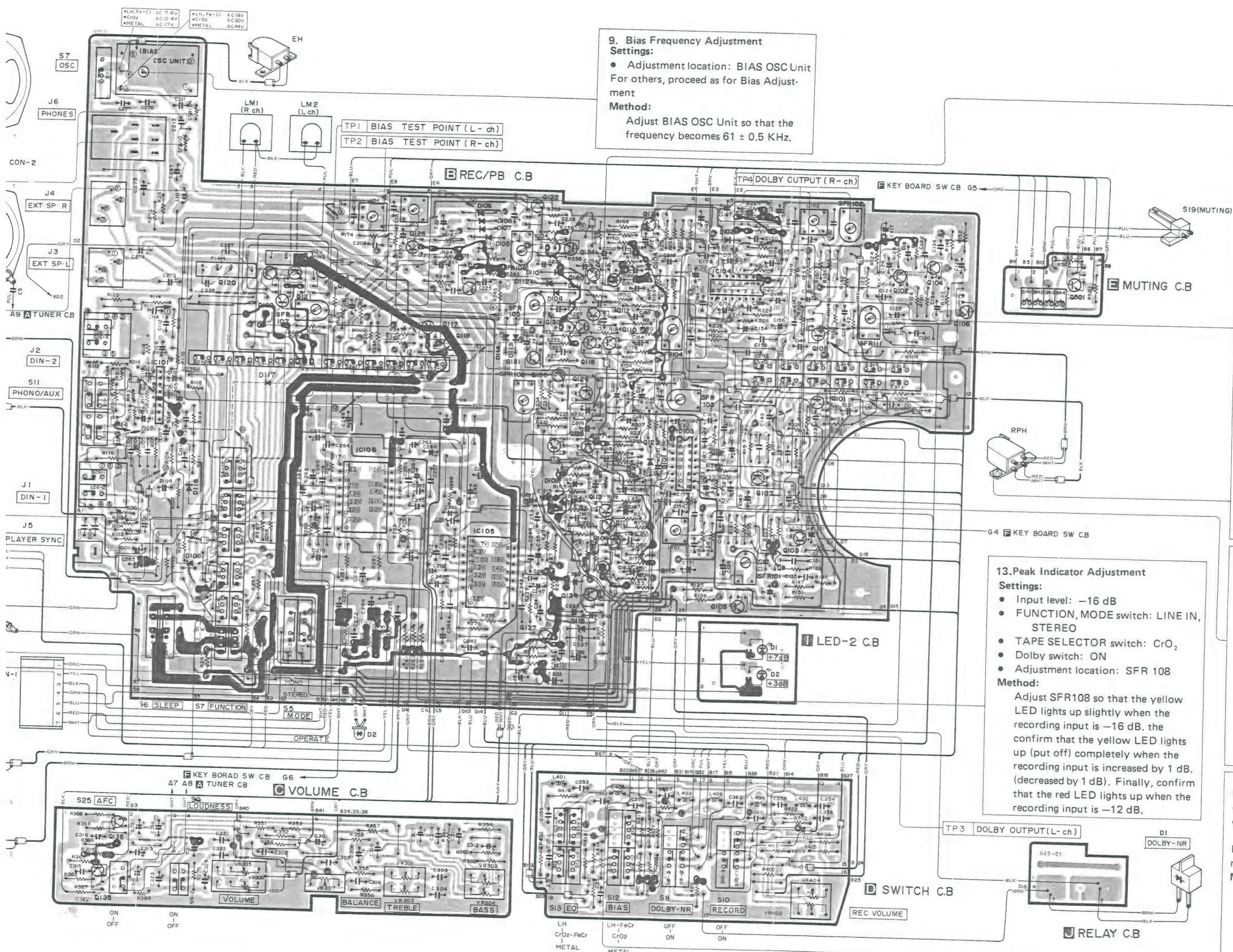
WIRING-1



NOTES (1) B(+) Pattern Component side pattern Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

5 6 7 8 9 10 11 12 13 14 15 16 17 18



9. Bias Frequency Adjustment

Settings:

- Adjustment location: BIAS OSC Unit
- For others, proceed as for Bias Adjustment

Method:

Adjust BIAS OSC Unit so that the frequency becomes 61 ± 0.5 KHz.

4. Dolby Level Adjustment

Settings:

- Adjustment locations: SFR 105 (L-ch), SFR 106 (R-ch)

For others, proceed as for Playback Level Adjustment

Method:

Adjust SFR 105, 106 so that the level meter indication is Dolby level (+3 dB).

5. Recording Gain Adjustment

Settings:

- Input level: -80 dB
- FUNCTION, MODE switch: TAPE, STEREO
- TAPE SELECTOR switch: CrO₂
- ALC switch: OFF
- DOLBY NR switch: ON
- Adjustment location: SFR 111

Method:

Adjust SFR 111 so that the voltage becomes the same for both left and right channels.

1. Azimuth Adjustment

Settings:

- Test Tape: TTA-117E
- TAPE SELECTOR switch: CrO₂
- Adjustment location: Azimuth adjusting screw

Methods:

Playback the test tape and adjust so that the output of the 10 KHz section reaches the maximum and same phase for both the left and right channel.

12. Dolby Trap Coil Adjustment

Settings:

- Input level: Less than -100 dB
- FUNCTION, MODE switch: LINE IN, STEREO
- TAPE SELECTOR switch: CrO₂
- Dolby switch: ON
- ALC, OSC switch: OFF, "—" position
- Adjustment locations: L101 (L-ch), L102 (R-ch)

Method:

Adjust L101, 102 so that the output level is minimum value.

10. Recording Current Adjustment

Settings:

- Input level: -13dB → -38dB
- Adjustment location SFR 103 (L-ch), SFR 104 (R-ch)

For others, proceed as for Bias Adjustment.

Method:

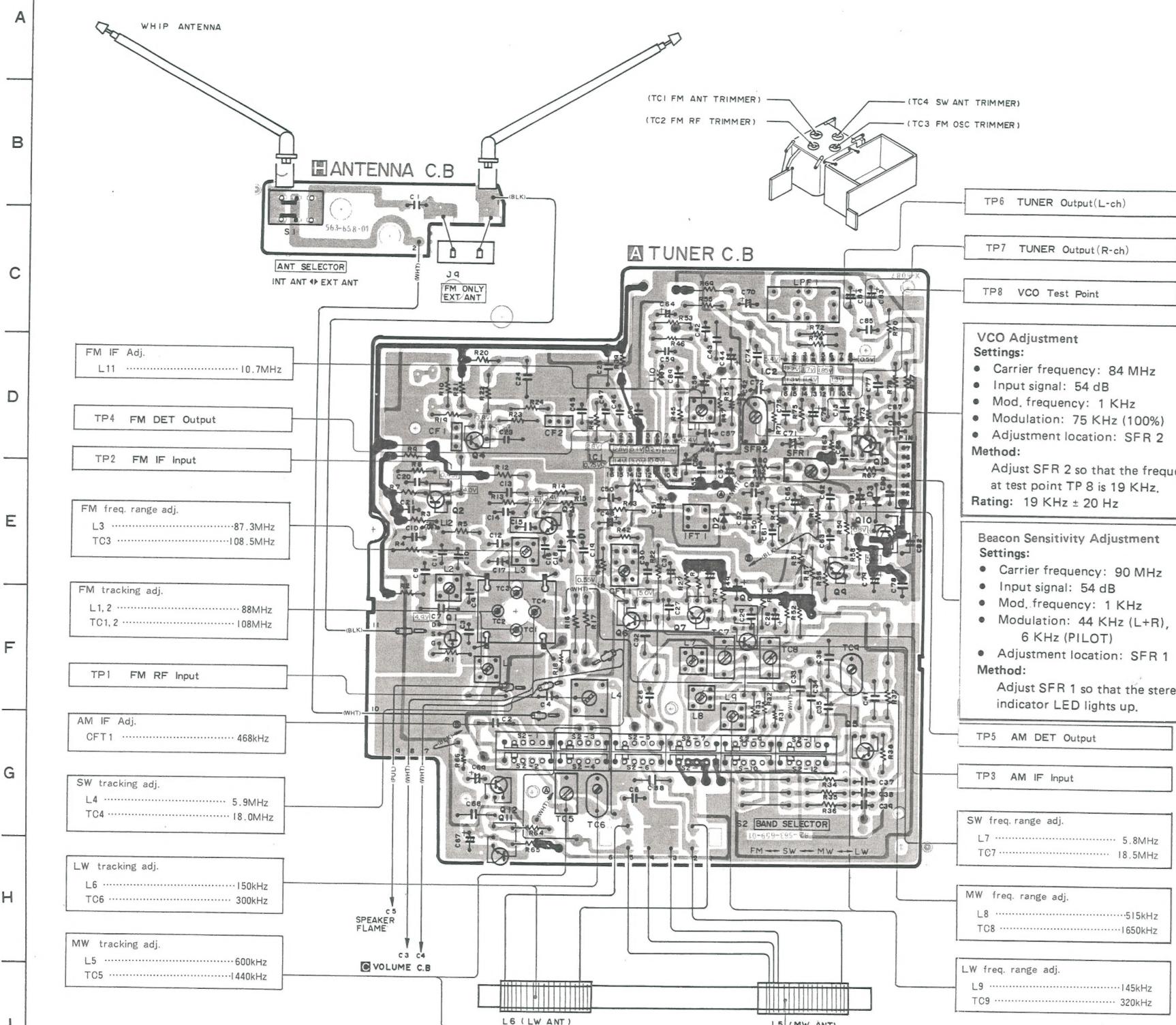
Adjust REC volume so that the Dolby level (+3 dB) when the input level is -13 dB. Next adjust SFR 103, 104 so that voltage of both channel becomes 1.2 mV (12 μ A) when the input level is decreased by 25dB. Cut the +B of BIAS OSC unit.

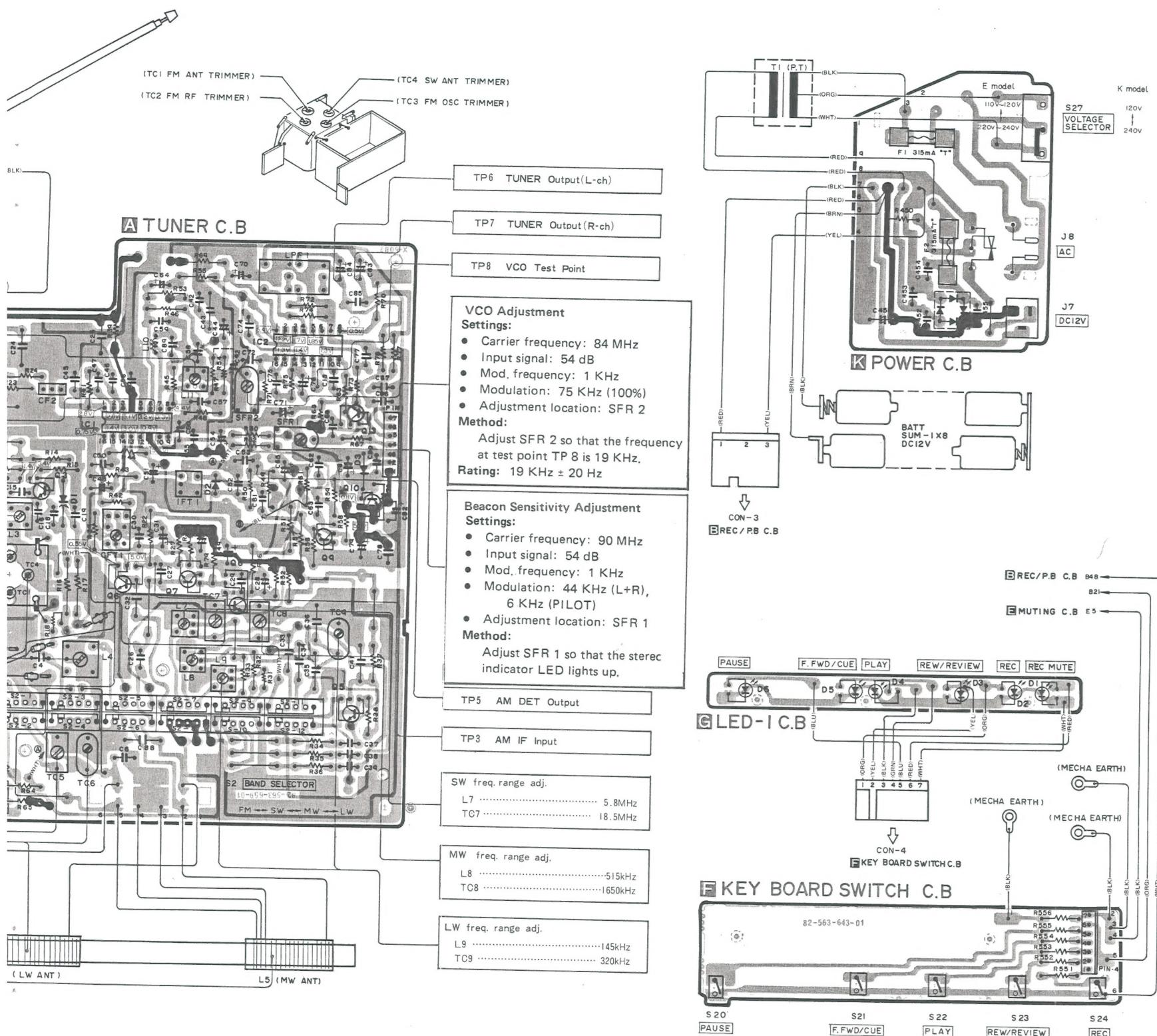
NOTES (1) B(+) Pattern Component side pattern Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.
An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

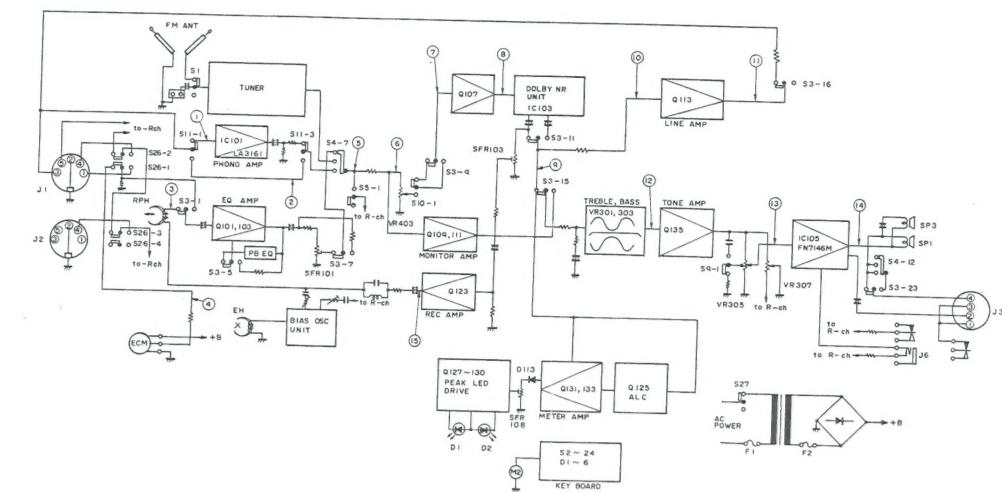
WIRING-2

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16

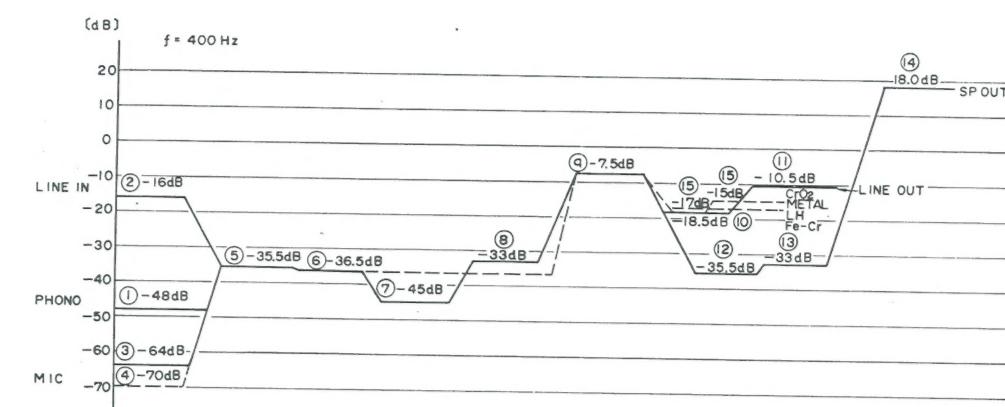




BLOCK DIAGRAM



LEVEL DIAGRAM



ITES (1) B(+) Pattern Component side pattern Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. But () is with AM reception.

MD-1 MECHANICAL PARTS

PARTS LIST

■ *mark in this part list shows exclusive part
(which is used) for only MD-1 mechanism.

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1	82-564-260-01		MD-1 mechanism ass'y		1
2	82-564-202-01		P-spring, Lever stopper	*	1
3	82-564-243-01		Mechanism frame	*	1
4	82-564-242-01		Plate, Push-button E	*	1
5	82-564-255-01		Plate, Push-button D	*	5
6	82-564-262-01		Plate, Slide lever holder	*	1
7	82-564-276-01		E-spring, Anti-misoperation lever	*	3
8	82-564-274-01		Anti-misoperation lever A ass'y	*	1
9	82-564-231-01		Anti-misoperation lever ass'y	*	1
10	82-564-232-01		Lever, Anti-misoperation A	*	2
			Lever, Anti-misoperation B	*	1
11	82-564-268-01		Lever, Anti-misoperation C	*	1
12	82-564-273-01		Lever, Anti-misoperation F	*	1
13	82-564-271-01		T-spring, Anti-misoperation	*	1
14	82-564-256-01		Plate nut	*	1
15	82-564-237-01		Holder, Switch	*	1
16	82-564-249-01		Slide plate, FR	*	1
17	82-564-264-01		E-spring, Lever FR	*	1
18	82-564-235-01		Lever-switch	*	1
19	82-564-263-01		T-spring, Lever switch	*	1
20	82-563-222-01		Holder, Cassette arm ass'y	TPR-990	1
21	82-563-260-11		T-spring, REC blocking	TPR-990	1
22	82-563-259-01		Lever B, REC blocking	TPR-990	1
23	82-564-261-01		T-spring, Lever stopper	*	1
24	82-564-221-01		Lever, PAUSE gear stopper	*	1
25	82-564-220-01		Lever, STOP gear stopper	*	1
26	82-564-219-01		Lever, FF gear stopper	*	1
27	82-564-218-01		Lever, Play gear stopper	*	1
28	82-564-217-01		Lever, REW gear stopper	*	1
29	82-564-216-01		Lever, REC gear stopper	*	1
30	82-564-240-01		Shaft, Gear stopper	*	1
31	82-564-258-01		Holder (R-P) ass'y	*	1
32	82-564-201-01		Mechanism frame A	*	1
33	82-564-236-01		Shaft bearing	*	2
34	82-564-267-01		T-spring, REV lock B	*	1
35	82-564-208-01		T-spring, REV lock A	*	1
36	82-564-266-01		T-spring, REV lock A	*	1
37	82-564-239-01		Shaft, Gear C	*	1
38	82-564-224-01		Gear B	*	1
39	82-564-241-01		Shaft, Gear PLAY	*	2
40	87-031-537-01		Micro switch, S18		1
41	82-564-225-01		Lever push button ass'y	*	6
42	82-564-253-01		Gear, REC	*	1
43	82-564-214-01		Gear, FR	*	2
44	82-564-213-01		Gear, PLAY	*	1
45	82-564-252-01		Gear, STOP	*	2
46	82-564-247-01		Gear D	*	2
47	82-564-228-01		Gear C	*	2
48	87-031-548-01		Leaf switch, PAUSE		1

The following is the part number list of the ***** marked parts of the PM-1 mechanism.

Ref. No.	Part No.	Description	Q'ty		Ref. No.	Part No.	Description	Q'ty
1-13	82-385-332-11	Spring B, Head adjusting	1		2-49	82-562-227-01	Main belt	1
1-14	87-046-178-01	Rec./Pb head	1		2-50	82-439-496-01	Flywheel ass'y	1
1-31	87-046-179-01	Erase head	1		2-51	82-385-314-21	Rubber belt	1
2-33	82-439-228-31	REC lever	1		2-60	82-385-309-21	Worm gear B ass'y	1

ACCESSORIES/PACKAGE

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1	82-563-855-01-		Printed indiv., Packing	*	1
2	82-563-856-01		Cushion L, Printed indiv.	*	1
3	82-563-857-01		Cushion R, Printed indiv.	*	1
4	87-051-137-11		Poly-vinyl sack (for AC power cord)		1
5	87-056-613-01		Poly-vinyl sack (for case)		1
6a	82-563-907-01		Instructions booklet (E model only)	*	1
6b	82-563-908-01		Instructions booklet (K model only)	*	1
7	82-563-905-01		Label, POP	*	1
8	87-056-009-41		Distributors list		1
9	87-056-008-11		Label, AC power cord (K model only)		1
10	87-056-016-01		Tag, Main voltage (K model only)		1
11	87-056-046-01		Label, Main supply (K model only)		1
12	82-916-620-01		Tape cassette, DMC-152		1
13	87-034-883-01		AC power cord (E model only)		1
14	87-034-871-01		AC power cord (K model only)		1